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DRAFT

Assessment of Qualification for Treatment under the Arizona Natural and Exceptional Events Policy for the High Particulate (PM₁₀) Concentration Event in the Paul Spur Area on May 12, 2008

Background

ADEQ operates a particulate monitor that measures particulate matter smaller than 10 microns (PM₁₀) near the Paul Spur Chemical Lime plant west of Douglass, AZ. In the 1990 Paul Spur - Douglass PM₁₀ State Implementation Plan (SIP), a series of specific control measures were prescribed for the area to address sources of particulates and were implemented (see attached). While the Douglass and Paul Spur areas are combined for one nonattainment designation, there are separate control strategies for each location. The control strategies for the Lime Plant are focused on industrial activities, while the control strategies for the Douglass area are focused on vehicle traffic and fugitive dust from roads. It is assumed that all appropriate SIP control measures were in place during the May 12th high wind event, demonstrating, per 40 CFR 50.1(j), that the event “is not reasonably controllable or preventable.” The monitoring record at the Paul Spur Chemical Lime Plant is consistent with a clean data finding to allow the area to be redesignated as attainment for particulate matter and would be eligible for a limited maintenance plan to assure the attainment status of the area is maintained.

The Arizona Department of Environmental Quality (ADEQ) issues a Dust Control Action Forecast for Maricopa County as part of the Natural Events Action Plan for the area. Additionally, ADEQ also issues a Dust Re-Entrainment Risk Wind Forecast for the Green Valley area south of Tucson as well as a Yuma Wind forecast for the

Yuma area. All of these forecasts issued on Sunday, May 11, 2008, indicated that strong winds were likely throughout much of the state and that there was a moderate risk of wind blown dust for these areas (see attachments). In addition to these standard forecasts, a PM₁₀ Health Watch was also issued for the Phoenix Metro area in anticipation of elevated PM₁₀ concentrations from wind blown dust. While there is not a specific forecast for the Douglass / Paul Spur area, the issuance of a PM₁₀ Health Watch in conjunction with multiple forecasts of moderate risks for wind blown dust is evidence that the high wind event on May 12, 2008, was expected to be a region wide phenomenon. These forecasts/advisories satisfy the requirement in 40 CFR 51.920(a)(1).

Elevated PM₁₀ concentrations were measured at the Paul Spur Chemical Lime Plant on May 12th. The Paul Spur measurements were from a Partisol 2000 filter-based Federal Reference Method (FRM) monitor that does not provide hourly values. Unfortunately, nearby monitors at Douglass Red Cross and Aqua Prieta Fire Station also do not provide these hourly data. While these nearby monitors did not measure PM₁₀ concentrations as high as the Paul Spur monitors, the values were above typical values as shown in the ‘Historical Distribution’ Table in Figure 1. This is discussed further in Section 3. The table below shows the key PM₁₀ monitor readings for the monitors examined in this report.

Monitor (Operator/Type)	AQS ID	24-hr Avg PM ₁₀	1-hr Max PM ₁₀	Time of Max 1-hr	Flag**
COCHISE COUNTY					
Paul Spur (ADEQ/FRM – Primary)	04-003-0011 (1)*	160	N/A	N/A	A or RJ
Paul Spur (ADEQ/FRM – Collocated)	04-003-0011 (2)*	156	N/A	N/A	A or RJ
Douglass Red Cross (ADEQ/FRM)	04-003-1005*	80	N/A	N/A	None
Aqua Prieta FS (ADEQ/FRM)	80-026-1000*	90	N/A	N/A	None

* EPA Air Quality System Identification Number

** 24-hr PM₁₀ concentration influenced by natural or exceptional event to be flagged.

Type Abbreviations: BAM – Beta-Attenuation Mass Monitor (Continuous monitor)

TEOM – Tapered Element Oscillating Microbalance Monitor (Continuous monitor)

FRM – Federal Reference Method

The preliminary findings from this analysis were presented at a stakeholders meeting on November 19, 2008, in Phoenix, Arizona. Following this stakeholders meeting, ADEQ will finalize this demonstration and solicit public

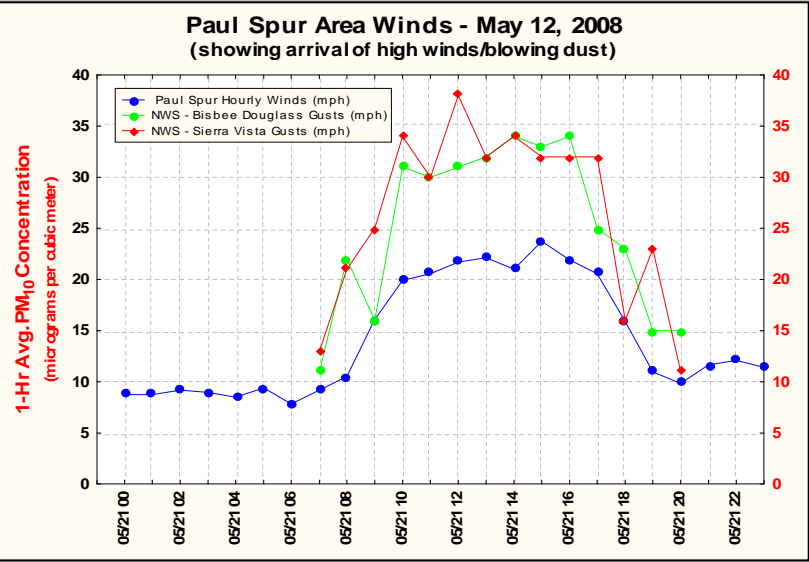
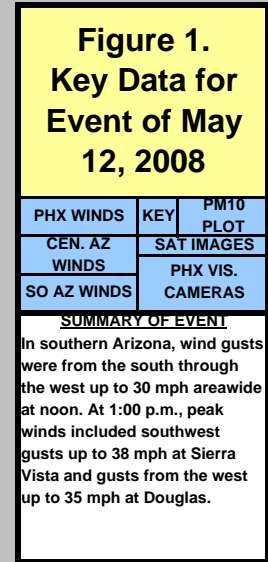
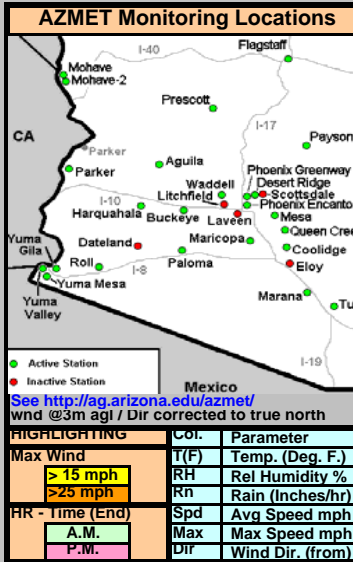
comment on the final demonstration. Any comments that are received will be forwarded to EPA with this demonstration pursuant to 40 CFR 50.14(c)(3)(i).

SE AZ - BONITA							
Hr	T(F)	RH	Rn	Spd	Max	Dir	
1	61	15	-	3	8	N	09-Bonita
2	60	16	-	3	6	NE	
3	56	19	-	1	4	NE	
4	56	23	-	3	6	NE	
5	53	25	-	2	7	NE	
6	48	27	-	3	6	E	
7	58	19	-	1	6	E	
8	66	13	-	1	4	NE	
9	71	9	-	2	6	E	
10	74	7	-	6	15	SW	
11	77	6	-	10	21	SW	
12	79	6	-	11	24	W	
1	81	5	-	13	27	W	33-Bowie
2	82	4	-	13	24	W	
3	83	5	-	14	28	W	
4	83	6	-	15	25	W	
5	81	7	-	17	27	W	
6	79	7	-	16	26	W	
7	75	9	-	12	21	W	
8	71	12	-	9	16	SW	
9	70	14	-	9	15	W	
10	68	17	-	11	17	SW	
11	67	21	-	10	17	W	
12	43	65	-	3	7	E	

SE AZ - BOWIE							
Hr	T(F)	RH	Rn	Spd	Max	Dir	
1	66	12	-	4	7	W	33-Bowie
2	64	13	-	5	8	NW	
3	66	13	-	6	11	W	
4	68	11	-	8	12	NW	
5	67	10	-	9	13	NW	
6	62	11	-	7	12	NW	
7	64	12	-	4	9	NW	
8	71	13	-	2	8	S	
9	74	9	-	6	12	W	
10	78	7	-	6	12	SW	
11	80	7	-	9	21	W	
12	82	6	-	13	27	W	
1	83	6	-	13	24	SW	08-Parker
2	85	6	-	13	26	W	
3	85	5	-	14	26	W	
4	85	6	-	13	24	W	
5	84	6	-	12	24	W	
6	82	7	-	13	24	W	
7	79	8	-	11	19	W	
8	76	9	-	7	15	W	
9	74	10	-	6	13	W	
10	73	11	-	5	15	W	
11	72	11	-	6	16	W	
12	43	65	-	3	7	E	

NWS-Bisbee Douglass INT Airport							
Hr	T(F)	VR	Dust	Spd	Gust	Dir	
1	67	10	-	5	5	SE	NWS-Bisbee Douglass INT Airport
2	67	10	-	5	5	S	
3	61	10	-	7	7	S	
4	68	10	-	0	0	N	
5	62	10	-	3	3	S	
6	62	10	-	6	6	SE	
7	64	10	-	7	7	S	
8	73	10	-	11	11	SW	
9	78	10	-	13	22	SW	
10	81	10	-	10	16	S	
11	83	10	-	18	31	SW	
12	87	10	-	23	30	SW	
1	88	10	-	10	31	SW	NWS-Sierra Vista - Libby AAF Airport
2	89	10	-	24	32	W	
3	86	10	-	21	34	W	
4	87	10	-	24	33	W	
5	85	10	-	25	34	W	
6	82	10	-	18	25	W	
7	77	10	-	15	23	W	
8	73	10	-	15	15	W	
9	71	10	-	15	15	SW	
10	62	10	-	10	10	SW	
11	64	10	-	11	11	SW	
12	65	10	-	13	13	SW	

NWS-Sierra Vista - Libby AAF Airport							
Hr	T(F)	VR	Dust	Spd	Gust	Dir	
1	72	10	-	0	0	N	NWS-Sierra Vista - Libby AAF Airport
2	69	10	-	6	6	S	
3	68	10	-	5	5	SW	
4	65	10	-	0	0	N	
5	66	10	-	8	8	S	
6	66	50	-	0	0	N	
7	70	50	-	5	5	VR	
8	73	50	-	13	13	SW	
9	75	50	-	8	21	S	
10	77	50	-	11	25	SW	
11	81	50	-	25	34	SW	
12	81	50	-	18	30	S	
1	84	35	-	31	38	SW	02-YumaValley
2	82	35	-	22	32	W	
3	82	35	-	24	34	W	
4	82	35	-	17	32	SW	
5	81	35	-	20	32	SW	
6	79	35	-	23	32	W	
7	73	50	-	16	16	W	
8	72	10	-	15	23	SW	
9	70	10	-	11	11	SW	
10	66	10	-	7	7	SW	
11	66	10	-	13	13	SW	
12	64	10	-	10	10	SW	



PARKER							
Hr	T(F)	RH	Rn	Spd	Max	Dir	
1	69	39	-	9	12	S	08-Parker
2	69	36	-	11	14	SW	
3	68	34	-	11	16	S	
4	64	36	-	7	11	S	
5	64	35	-	8	13	S	
6	63	35	-	7	11	S	
7	63	44	-	7	11	S	
8	67	43	-	8	12	S	
9	74	33	-	12	17	S	
10	77	32	-	13	17	S	
11	80	29	-	13	19	SW	
12	84	24	-	14	22	SW	
1	87	24	-	15	22	SW	ADEQ-Paul Spur
2	87	23	-	16	21	SW	
3	88	22	-	16	22	SW	
4	87	20	-	17	22	S	
5	84	23	-	16	23	S	
6	84	22	-	16	24	SW	
7	82	20	-	17	24	SW	
8	79	22	-	17	24	SW	
9	76	27	-	13	23	S	
10	75	28	-	5	25	SW	
11	74	29	-	6	18	SW	
12	76	25	-	12	18	NW	

ADEQ-Paul Spur							
Hr	T(F)	RH	Rn	Spd	Max	Dir	
1	N/A	N/A	-	9	9	W	ADEQ-Paul Spur
2	N/A	N/A	-	9	9	W	
3	N/A	N/A	-	9	9	SW	
4	N/A	N/A	-	9	9	SW	
5	N/A	N/A	-	9	9	SW	
6	N/A	N/A	-	9	9	SW	
7	N/A	N/A	-	8	8	W	
8	N/A	N/A	-	9	9	SW	
9	N/A	N/A	-	11	11	SW	
10	N/A	N/A	-	16	16	SW	
11	N/A	N/A	-	20	20	SW	
12	N/A	N/A	-	21	21	SW	
1	N/A	N/A	-	22	22	SW	01-Tucson
2	N/A	N/A	-	22	22	SW	
3	N/A	N/A	-	21	21	SW	
4	N/A	N/A	-	24	24	SW	
5	N/A	N/A	-	22	22	W	
6	N/A	N/A	-	21	21	W	
7	N/A	N/A	-	16	16	W	
8	N/A	N/A	-	11	11	W	
9	N/A	N/A	-	10	10	SW	
10	N/A	N/A	-	12	12	SW	
11	N/A	N/A	-	12	12	SW	
12	N/A	N/A	-	11	11	SW	

Historical Distribution							
5-Yr. Dist. of Values (µg/m³)				Column Index			
MONITORS:				Column Index			
1-PAUL SPUR FRM				Yr - All Data (5-Yrs)			
2-PAUL SPUR COLL				Sea - Data for Spring season only (5-Yrs)			
Cum. Freq.	Mon 1	Mon 2		Cum. Freq.	Mon 1	Mon 2	
Min	2	2	2	Min	2	2	2
0.5%	2	2	2	0.5%	3	6	11
1.0%	2	2	2	1.0%	5	10	17
2.5%	3	2	3	2.5%	8	13	18
5%	5	6	6	5%	10	13	21
10%	8	10	8	10%	12	15	24
25%	12	13	13	25%	17	20	34
50%	20	20	21	50%	27	29	52
75%	31	35	32	75%	40	39	75
90%	41	46	41	90%	51	48	96
95%	49	61	54	95%	59	65	117
97.5%	63	69	66	97.5%	74	80	132
99.0%	76	110	91	99.0%	82	86	154
99.5%	82	159	97	99.5%	87	87	166
Max	207	207	188	Max	94	87	172
Flagged Value	160	156		Value	80	90	
Conclusion: Flagged Value is exceptional in nature (ie greater than 95% of all data)							

Historical Distribution							
5-Yr. Dist. of Values (µg/m³)							
MONITORS:				Column Index			
4-DOUGLAS RED CR				Yr - All Data (5-Yrs)			
5-AGUA PRIETA FIR				Sea - Data for Spring season only (5-Yrs)			
Cum. Freq.	Mon 1		Mon 2				
	Yr	Sea	Yr	Sea			
Min	2	2	8	8			
0.5%	3	6	11	13			
1.0%	5	10	17	17			
2.5%	8	13	18	21			
5%	10	13	21	23			
10%	12	15	24	27			
25%	17	20	34	40			
50%	27	29	52	53			
75%	40	39	75	71			
90%	51	48	96	91			
95%	59	65	117	109			
97.5%	74	80	132	118			
99.0%	82	86	154	130			
99.5%	87	87	166	144			
Max	94	87	172	159			
Value	80		90				

Assessment Under the Technical Criteria Document (TCD)

1. Properly qualify and validate the air quality measurement to be flagged. This was a filter sampling date (1-in-6 run day). As such, data from all filter and continuous analyzers were examined. The air quality monitoring data were reviewed by the agency responsible for operation of the monitor. Data from the Paul Spur monitors operated by ADEQ were found to be valid. Measurements at nearby monitors operated by ADEQ were also examined and found to be valid. Audits of the analyzers revealed operations were within acceptable tolerance. While no local sources were reported as significantly contributing to the air quality episode, it is possible that particulate matter from the Paul Spur Chemical Lime Plant contributed to the measured values.

2. Review suspected contributing sources. The Arizona Meteorological Network (AzMET), National Weather Service (NWS), and ADEQ meteorological monitoring data all indicate a prolonged period of strong and gusty winds throughout the day on May 12th. Numerous weather stations in southeastern Arizona reported sustained winds of 20-25 mph with gusts approaching 40 mph. It is likely that background concentrations of PM were elevated due to the strong winds observed. Elevated levels of PM₁₀ measured at the Douglass Red Cross and Aqua Prieta monitors are evidence of these high background concentrations. While the Douglass and Aqua Prieta values were likely representative of background concentrations on May 12th, those values measured at Paul Spur were significantly higher. This information, coupled with the wind direction data, is a strong indication that the measured concentrations at the Paul Spur monitors may have been influenced by local sources. The Paul Spur PM₁₀ monitors are located to the northeast of the Chemical Lime Plant. Meteorological data from nearby Bisbee Douglass International Airport and Sierra Vista Airport, as well as the site specific wind data, indicate that the predominant wind direction was out of the west and southwest throughout the entire day. It is assumed that all appropriate control measures required by the 1990 Paul Spur - Douglass PM₁₀ SIP were in place during this event. Despite these control measures, winds were sufficiently high to overwhelm any dust control measures in place.

3. Examine all air quality monitoring information. Data from all monitors in the network were reviewed. Monitoring data from the Paul Spur monitors are summarized in the table in the Background section of this assessment. Filter data for the Douglass Red Cross and Aqua Prieta monitors operated by ADEQ were also examined. Pursuant to 40 CFR 50.14(c)(3)(iii)(C), the "Historical Distribution" Table in Figure 1 has been

included to demonstrate that the event is associated with measured concentrations in excess of normal historical fluctuations, including background (i.e., concentrations greater than the 95th percentile).

4. Examine the meteorological conditions before and during the event. The AzMET, NWS, and ADEQ meteorological data are summarized in Figure 1. The wind data are highlighted yellow if the maximum wind speed in the hour exceeds 15 mph and orange if it exceeds 25 mph. Upper level plots show a subtropical jet located over southeastern Arizona throughout much of the day on May 12th. During the overnight hours of May 11th into the early morning hours of May 12th, surface winds remained fairly light. As daytime heating commenced in the late morning hours of May 12th, the strong mid and upper level winds associated with the upper level jet mixed down to the surface to produce strong southwesterly winds. During hours in which maximum mixing heights were reached, winds gusted to nearly 40 mph at the Sierra Vista airport. Hourly averaged wind speeds at the Paul Spur monitoring site reached 24 mph during this time. Surface winds decreased in the evening as daytime heating ended.

5. Perform a qualitative attribution to emission source(s). There is considerable evidence that indicates the elevated PM₁₀ concentrations in the Paul Spur area may be attributed to activity associated with the Chemical Lime Plant located to the southwest of the PM₁₀ monitors. The meteorological data do suggest, however, that wind speeds may have been high enough to overwhelm local dust control measures. No source-specific emission allocation is possible based on the data available for analysis.

6. Estimation of Contribution from Sources or Events. Typically, hourly concentration data are used to quantify an estimate of the event contribution. Unfortunately, this event occurred at a location where continuous analyzers are not in use. Instead, only one value is given for each PM₁₀ monitor that represents the entire 24 hour period from May 12th. While one can speculate that the majority of the PM₁₀ concentration was measured during a 10 hour period of high winds, a quantitative estimate is not possible. As an alternative to this approach, one could use the 'Historical Distribution' Table in Figure 1 and use the median values (50th percentile) as an estimate of 'typical concentrations.'

7. Determination that a Natural or Exceptional Event Contributed To an Exceedance. Based on this analysis, the event satisfies the requirement in 40 CFR 50.1(j) that the elevated concentrations at the flagged monitoring sites were attributed to a natural event.

Conclusion

High-wind transport of dust from soils. The elevated concentrations at Rillito were a result of long-range transport of dust and soils from high winds that suspended natural soils and soils from areas where Best Available Control Measures are in place and should be flagged for air

quality planning purposes. The "high wind" flag (A or RJ) should be applied to the monitor readings indicated in the summary table at the beginning of this report, as the monitor would have been below the NAAQS but for the contribution of the event.